

$$9.8 \text{ m/s}^2$$

Bellringer

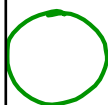
1 amu
1) Convert 13 cm to km

$$13 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = .13 \text{ m} \times \frac{1 \text{ km}}{1000 \text{ m}} = .00013 \text{ km} = 1.3 \times 10^{-4} \text{ km}$$

protons
neutrons

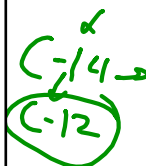
2) Convert 0.2 mm to m

$$0.2 \text{ mm} \times \frac{1 \text{ m}}{1,000 \text{ mm}} = .0002 \text{ m} = 2 \times 10^{-4} \text{ m}$$



3) What is molar mass?

Isotope?



4) What is the difference between mass and weight?

$6.022 \times 10^{23} \text{ atoms}$

128

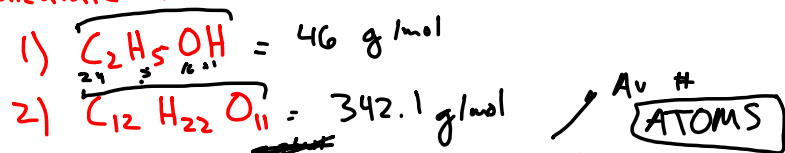
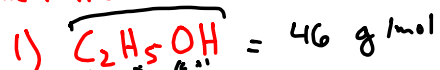
132, 135, 141, 142, 165-169, 172,

183, 186, 188



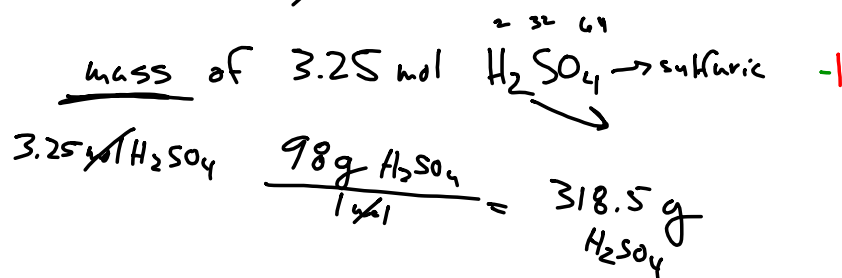
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→ Calculate the molar mass of:



→ What is the mass of $4.35 \times 10^{-2} \text{ mol}$ of ZnCl_2 ?

$$\frac{4.35 \times 10^{-2} \cancel{\text{mol}}}{\cancel{1 \text{ mol}}} = \frac{136.29 \text{ g}}{1 \cancel{\text{mol}}} = 5.93 \text{ g ZnCl}_2$$



10.1/10.2 Review

Grade: 11th

Subject: Chemistry

Date:

1 Determine the number of ~~moles~~^{atoms} in 3.54 mol of Sulfur.

A 1.70×10^{23}

B 1.70×10^{24}

C 2.13×10^{23}

☒ D 2.13×10^{24}

$10^{23} \rightarrow 10^{24}$

2 How many particles are present in one mole of particles?

☒ A 6.02×10^{23}

B 3.0×10^8

C 1

D 12

3 The sucrose molecule is a large and complex molecule of carbon, hydrogen, and oxygen. How many sucrose molecules in 0.5 moles of sucrose?

A 6.02×10^{23}

B 1.20×10^{23}

☒ C 3.01×10^{23}

D 1.20×10^{24}

4 Which of the following units would be most appropriate for counting sheets of paper sold at a store?

A dozen

☒ B ream

C mole

D pair

5 How many moles of Chlorine (Cl) are in 100g of Cl?

A 0.355

☒ B 2.82

C 64.6

D 100

Element	Molar Mass (g/mol)
Hydrogen	1.01
Carbon	12.01
Chlorine	35.45

6 Which of the following quantities would have the greatest mass: one mole of carbon atoms, one mole of helium atoms, or one mole of neon atoms?

A one mole of carbon

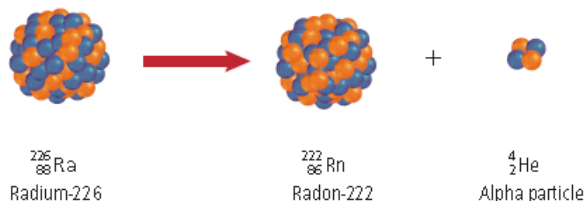
B one mole of helium

☒ C one mole of neon

D they are all equal

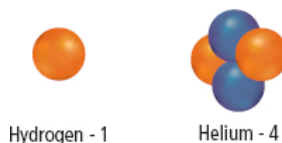
- 7 Radium is a radioactive element that decays into radon gas. Its atomic mass is 226g. How many moles in 500 grams of radium?

- A 2.2 moles
 B 7.1 moles
 C 3×10^{26} moles
 D 0.452 moles



- 8 The atomic mass of Hydrogen-1 is 1.008 and the atomic mass of Helium-4 is 4.003. Find the difference in grams between 4 moles of H and 1 mole of He.

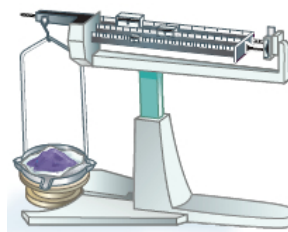
- A 0.029 g
 B 1.7×10^{22} g
 C 0 grams
 D 4.81×10^{-26} g



$$1(1.008) - 4.003 =$$

9 What is the mass of one mole of carbon atoms?

- A 1 gram
 B 12.01 grams
 C 0.082696 grams
 D 24.02 grams



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→ Which has a larger percent composition of sulfur: H_2SO_3 or $\text{H}_2\text{S}_2\text{O}_8$
 $\frac{32.07}{82} = 39\%$ $\frac{64.14}{194} = 33\%$
 → Propane is a hydrocarbon with a percent composition of 81.82% carbon and 18.18% hydrogen. What is propane's empirical formula?

$$81.82\% \times \frac{1 \text{ mol}}{12.01 \text{ g C}} = \frac{6.8}{6.8} \quad 1$$

$$18.18\% \times \frac{1 \text{ mol}}{1.01 \text{ g H}} = \frac{18.18}{6.8} \approx 2.67 \rightarrow \text{CH}_3$$

C H O $\rightarrow \text{C}_2\text{H}_5$

Aspirin:

60% C, 4.44% H, 35.56% O

$$60\% \text{ C} \times \frac{1 \text{ mol}}{12.01 \text{ g C}} = \frac{5}{2.22} \text{ mol C} \quad 2.3 \text{ C}$$

$$4.44\% \text{ H} \times \frac{1 \text{ mol}}{1.01 \text{ g H}} = \frac{4.44}{1.01} \text{ mol H} = 4.4 \text{ mol H} \quad \text{C}_2\text{H}_2\text{O}$$

$$35.56\% \text{ O} \times \frac{1 \text{ mol}}{16 \text{ g O}} = \frac{22.22}{2.22} \text{ mol O} = 10 \text{ mol O}$$

$\text{C}_5\text{H}_4\text{O}_2$

10.3 Review

Grade: 11th
Subject: Chemistry
Date:

- 1 What is the mass of 5.0×10^{21} molecules of water (in grams)?

$$5.0 \times 10^{21} \text{ molecules of } H_2O$$

$$\rightarrow \text{mol} \rightarrow \text{molar mass of } H_2O$$

$$5.0 \times 10^{21} \text{ molecules} / AV\# \rightarrow \text{mol} \times \text{molar mass } H_2O$$

$$0.008 \text{ mol } H_2O \times 18 = .15 \text{ g}$$

2 What is the mass of 1.0×10^{12} molecules of O_2 ?

A 1.9×10^{13} g

B 6.0×10^{11} g

C 2.7×10^{11} g

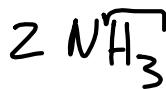
D 5.3×10^{11} g

$$1.66 \times 10^{-12} \text{ mol}$$

$$? / A_v \# = \text{mol}$$

$$\text{mol} \times \text{molar mass}_{O_2} = ? \text{ g}$$

3 How many moles of hydrogen atoms are present in 2.0 moles of ammonia NH_3 ?



6

1

.

4 What is the molar mass of H_2CrO_4 (in grams)?

118g

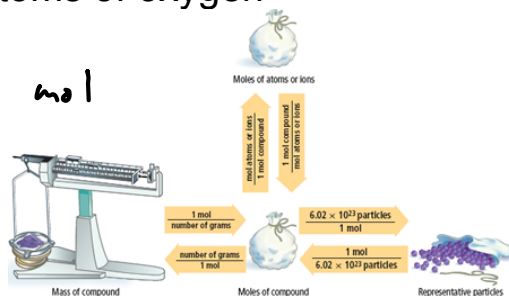
5 Acetic acid has the molecular formula CH_3COOH . How many atoms of oxygen are in 60 grams of acetic acid?

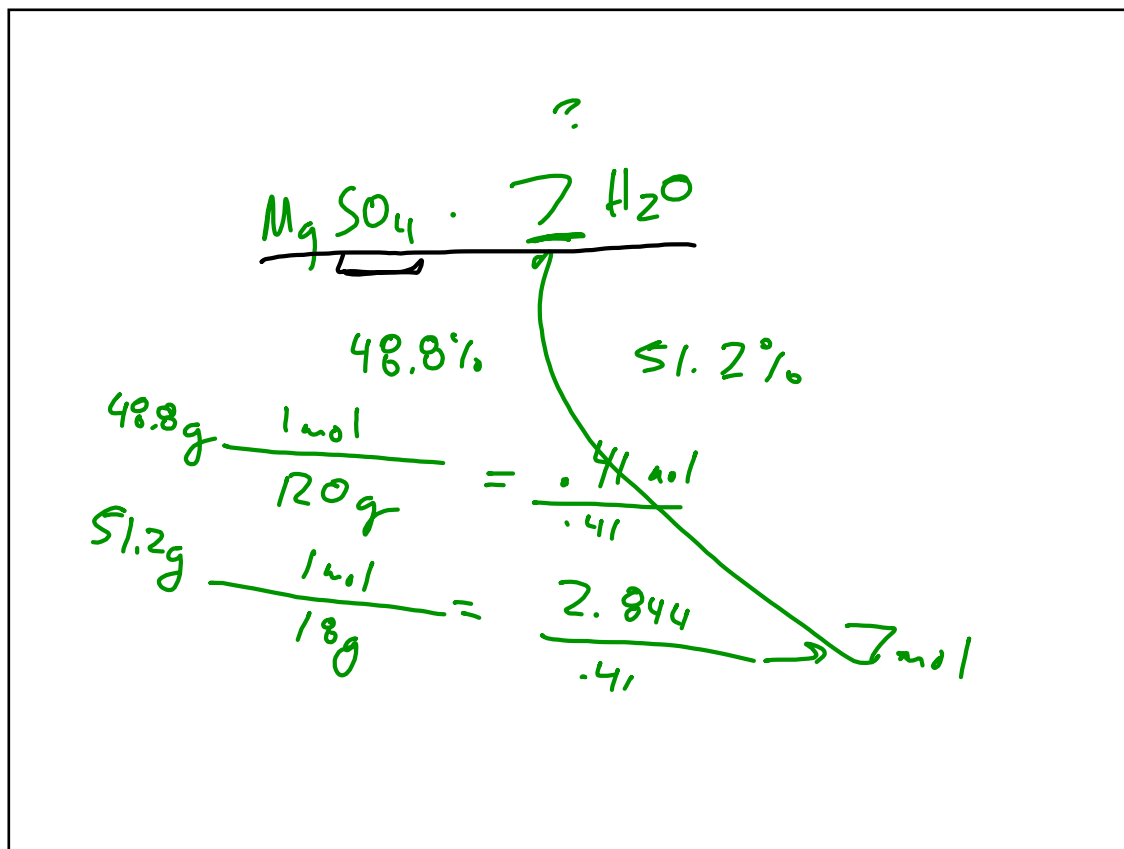
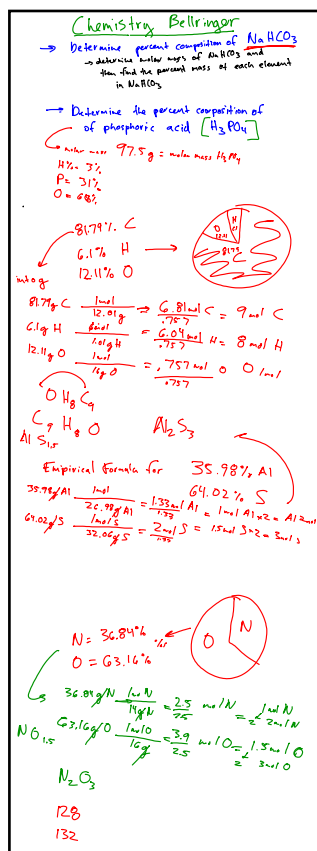
- A 6.0×10^{23} atoms of oxygen
 B 1.0×10^{22} atoms of oxygen
 C 3.6×10^{25} atoms of oxygen
 D 1.2×10^{24} atoms of oxygen

$60\text{g} / \text{molar mass acetic acid} = \text{mol}$

$\text{mol} \times \text{AV\#} =$

atoms





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- 1) What is the mass in grams of 1.50×10^{15} atoms of N?
- 2) How many moles of Oxygen atoms are in 5.00 mol of P_2O_5 ?

- 3) A colorless liquid has a percent composition 46.68% N and 53.32% oxygen. Its molar mass is 60.01 g/mol.

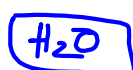
What is its molecular formula?

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→ The chemical formula for caffeine is $C_8H_{10}N_4O_2$. What is the % composition of each element in this molecule?

molar mass

$$\begin{array}{lcl}
 C \rightarrow 8 \times 12.01 \rightarrow \frac{96}{194} \rightarrow C\% \ 49.5\% \\
 H \rightarrow 10 \times 1.01 \rightarrow \frac{10}{194} \\
 N \rightarrow 4 \times 14 \rightarrow \frac{56}{194} \\
 O \rightarrow 2 \times 16 \rightarrow \frac{32}{194} \\
 \hline
 \boxed{194}
 \end{array}$$



→ 18 molar

$$\begin{array}{lcl}
 H \rightarrow \frac{2}{18} \rightarrow 11.1\% \\
 O \rightarrow \frac{16}{18} \rightarrow 88.9\%
 \end{array}$$

① % → grams out of 100

N → 36.84% →

O → 63.16% →

② grams → moles → figure how many moles of

$$36.84 \text{ g N} \times \frac{1 \text{ mol}}{14 \text{ g}} = \text{N} \frac{2.631 \text{ mol}}{2.631} = 1$$

$$63.16 \text{ g O} \times \frac{1 \text{ mol}}{16 \text{ g}} = \text{O} \frac{3.948 \text{ mol}}{2.631} = 1.5$$

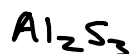
③ divide by least # of mol

④ make formula with whole #s

35.98% Al, 64.02% S

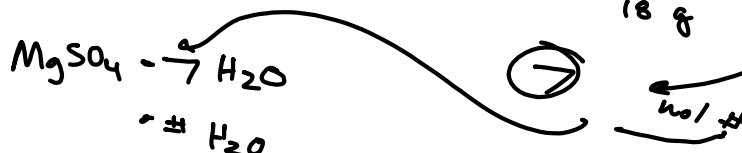
$$35.98 \text{ g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g}} = \frac{1.3 \text{ mol}}{1.3} = 1 \text{ mol Al} (\times 2)$$

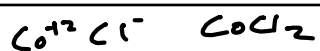
$$64.02 \text{ g S} \times \frac{1 \text{ mol S}}{32.06 \text{ g}} = \frac{2 \text{ mol}}{1.3} = 1.5 \text{ mol S} \rightarrow (\times 2)$$



$$\text{MgSO}_4 \quad 48.8\% \rightarrow 48.8 \text{ g} \quad \frac{1 \text{ mol MgSO}_4}{120.3 \text{ g}} = \frac{.4 \text{ mol}}{.4}$$

$$\text{H}_2\text{O} \quad 51.2\% \quad 51.2 \text{ g} \quad \frac{1 \text{ mol H}_2\text{O}}{18 \text{ g}} = \frac{2.84 \text{ mol}}{.4}$$





$$0.0712 \text{ mol CoCl}_2 \times \frac{129.6 \text{ g}}{1 \text{ mol CoCl}_2} = 9.23 \text{ g CoCl}_2$$

$$9.23 \text{ g CoCl}_2 \times \frac{1 \text{ mol}}{129.6 \text{ g}} = 0.0712 \text{ mol} \rightarrow 1$$

$$2.52 \text{ g H}_2\text{O} \times \frac{1 \text{ mol}}{18 \text{ g}} = 0.14 \text{ mol} \rightarrow 2$$

$$\pm 1 \text{ mol} \rightarrow \text{g}$$

$$\pm 1 \text{ mol} \times \frac{(\text{g}) \text{ molar mass}}{1 \text{ mol}} \rightarrow \text{g}$$

$$\text{H g} \times \frac{1 \text{ mol}}{\text{H g} \leftarrow \text{molar mass}}$$



2.25 g

 Na^+ ions? SO_3^{2-} ions?

$$2.25 \text{ g} \frac{1 \text{ mol}}{126 \text{ g}} \rightarrow 0.018 \text{ mol} \frac{6.02 \times 10^{23} \text{ formula}}{1 \text{ mol}}$$

$$1.08 \text{ formula units} \frac{2 \text{ Na}^+}{1 \text{ mol}} = 2.15 \times 10^{22} \text{ ions Na}^+$$

CaCl_2 \rightarrow water = 110.9 g

%. \rightarrow

Bellringer

\rightarrow Observe the 2 demos:

- 1) Straw
- 2) Can

Write what you think caused the outcome.

"Molar"/AV # & Mixed Review

Grade: 11th

Subject: Chemistry

Date:

- 1 The percent by mass of each element in a compound is called percent composition.

2 Three naturally occurring iron compounds are pyrite FeS_2 , hematite, Fe_2O_3 , and siderite FeCO_3 . Which contains the greatest percentage of iron?

A pyrite

B hematite

C siderite

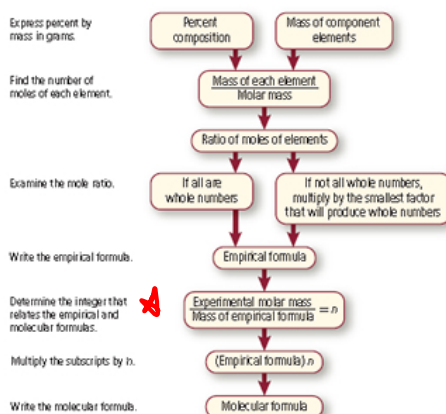
3 The empirical formula for a sample of liquid HO is 34 g/mol. What is its molecular formula?

A H_2O

B HO

C H_2O_2

D HO_2



- 4 The molecular formula for a compound is the formula with the smallest whole-number mole ratio of the elements.

True

False

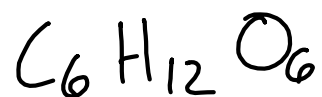
- 5 Which has the larger percent by mass of sulfur, H_2SO_3 or $\text{H}_2\text{S}_2\text{O}_8$?

A H_2SO_3

B $\text{H}_2\text{S}_2\text{O}_8$

- 6 A hydrate is a compound that has a specific number of water molecules bound to its atoms.

- 7 Calculate the mass of 3.62×10^{24} molecules of glucose.



$$\text{mol} \times \text{molar mass} \rightarrow \text{g}?$$

8 How many moles of iron ^{ions} can be recovered from 50.0 kg
of Fe_3O_4 ?

$215.7 \times$

9 Calculate the moles of aluminum ions present in 250.0 g
of aluminum oxide Al_2O_3 .

.

10 The density of lead (Pb) is 11.3 g/cm^3 . Calculate the volume of 1 mol of Pb (answer in cm^3).

.

11 Express the following answer with the correct number of significant figures. $4.233 / 0.0131 = ?$

.

12 Express the following answer with the correct number of significant figures. $18.23 - 456.7 = ?$